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## Original Research Article

# Fear of needles does not influence pain tolerance and sympathetic responses among patients during a therapeutic needling



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## ABSTRACT

**Introduction:** Dry needling is one of the therapies employed in pain medicine to reduce pain. However, no clear understanding exists as to whether there are differences in pain tolerance levels and sympathetic responses among individuals who have a fear of needles when compared to those who do not fear needling during dry needling treatment.

**Aim:** The main aim of this study was to investigate the differences in the pain pressure threshold and sympathetic changes among individuals who fear needling and those who do not fear needling during a sham dry needling procedure over a latent trigger point on the upper trapezius.

**Material and methods:** A cross sectional study was conducted in the Physiotherapy Outpatient Clinic at the University Teaching Hospital among 27 healthy subjects (12 subjects with needle phobia and 15 subjects with no fear of needles). Pain pressure threshold, blood pressure and heart rate were measured before and after the sham needling. The differences in the study variables between and within the groups were analyzed using a 2-way ANOVA.

**Results:** The results indicated no significant differences in pain pressure threshold ( $P > .05$ ), blood pressure ( $P > .05$ ) and heart rate ( $P > .05$ ) between and within the two groups. However, the mean ( $\pm$ SD) value of pain pressure threshold showed an increased trend among those subjects with a fear of needles when compared to subjects who do not fear needling,  $-3.12 (\pm 1.20)$  and  $2.97 (\pm 0.86)$ , respectively.

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*Conclusions:* Individuals who exhibit a fear of needles showed no differences in pain tolerance and sympathetic changes when compared to those who do not fear needling during dry needling treatment.

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## 1. Introduction

Musculoskeletal pain affects 85% of the general population,<sup>34</sup> and is a common complaint in primary care.<sup>7</sup> Myofascial trigger points (MTrPs) play a vital role in the pathophysiology of musculoskeletal pain.<sup>31</sup> MTrP is a hyperirritable spot and focal hyperalgesic contracture in skeletal muscles.<sup>14</sup> It was reported that MTrP could lead to a reduction in the pain pressure threshold of an individual.<sup>23</sup> Pain pressure threshold is the amount of pressure required to produce pain in a person.<sup>38</sup> Reduction in the pain pressure threshold causes the reduction of pain tolerance in a skeletal muscle with MTrP.<sup>9</sup>

Dry needling is one of the common invasive interventions used in treating MTrPs.<sup>37</sup> A systemic review has led to the conclusion that dry needling applied on MTrPs is an effective modality in reducing pain compared to no intervention at all.<sup>37</sup> Existing evidence showed that dry needling increased the pain pressure threshold of a muscle with MTrP.<sup>16</sup> An earlier study reported that dry needling reduced musculoskeletal pain significantly when compared with placebo needling (sham needling).<sup>36</sup> Thus, available evidence convincingly supports the thesis that dry needling reduces pain, increases pain pressure threshold and is superior to sham needling in pain reduction.<sup>16,36,37</sup> On the other hand, acupuncture, which also employs needles to treat patients, was also used to reduce pain.<sup>17</sup> Past studies on acupuncture indicated a significant reduction of pain after acupuncture therapy.<sup>13</sup> Thus, interventions such as dry needling and acupuncture which involve needles are commonly used therapeutically to reduce pain.<sup>13,37</sup> However, in clinical practice, when a clinician encounters patients scheduled for dry needling or acupuncture who exhibit a fear of needles, it is not clear how such fear might alter the pain threshold by either increasing or decreasing the pain tolerance of the individual. Therefore, this study aimed to investigate the difference in the pain pressure threshold between individuals who do not have a fear of needles and those who have needle phobia during a sham needling procedure performed over the latent trigger point of the upper trapezius.

According to the American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders Fourth Edition (DSM-IV), approximately 10% of the world population were reported to have a fear of needles.<sup>15,35</sup> Past evidence showed that negative emotions such as fear, depression and anxiety could reduce the pain tolerance of an individual by increased pain perception toward noxious stimuli.<sup>1,29</sup> In addition, negative emotions resulted in an increased production of pain mediating substances such as bradykinin and substance P, which were reported to increase pain perception.<sup>2</sup> Therefore, this study hypothesized that those individuals who had a fear of needles presented with the reduced pain pressure threshold when compared to people without needle phobia during a sham needling procedure applied to the upper trapezius latent trigger point. To our knowledge, there were no reported studies that

investigated the influence of needle phobia and its effects on the pain pressure threshold. It is our opinion that the understanding of how a fear of needles might influence the pain pressure threshold would be helpful to interpret the clinical outcomes after dry needling and acupuncture and also for the science of pain management.

A review performed by Sokolowski quoted that individuals with a fear of needles experienced an increased heart rate and blood pressure before needle puncture, followed by a sudden drop in both blood pressure and heart rate after needle puncture.<sup>8,35</sup> Preliminary evidence also proved that blood pressure and heart rate increased in response to sympathetic changes caused by fear.<sup>3</sup> Besides, Meagher et al. stated that fear influenced pain perception by reducing pain tolerance associated with autonomic arousal manifested through vasoconstriction and blood pressure.<sup>21,27</sup> Hence, this current study tested the second hypothesis that the vasovagal response during needling was higher among people who exhibited needle phobia when compared to individuals without any fear of needles. Thus in this study, the changes in blood pressure and heart rate were measured as variables of interest during a sham needling procedure.

## 2. Aim

The aims of this study were (1) to investigate the pain pressure threshold among subjects with a fear of needles; (2) to measure the sympathetic response (blood pressure and heart rate) among people with and without needle phobia; and (3) to compare the sympathetic response (blood pressure and heart rate) and pain pressure threshold between individuals with needle phobia and those without needle phobia before and after a sham needling procedure.

## 3. Materials and methods

### 3.1. Subjects

A total of 27 subjects (12 with a fear of needles and 15 without needle phobia) participated in this cross sectional experimental study. Pain pressure threshold, blood pressure and heart rate were measured before and immediately after the sham needling procedure. The subjects for this study were recruited from the Outpatient Physiotherapy Clinic at the University Teaching Hospital. The subjects who participated in this study were carers who accompanied the patients to the Physiotherapy Clinic. The inclusion criteria were as follows: (1) healthy subjects aged 20–40 years old, (2) without any musculoskeletal and systemic diseases, (3) not under any medications for hypertension, diabetes or any other diseases and metabolic syndrome disorders, and (4) presence of latent trigger point on the right upper trapezius muscle. The study methodology was

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